In the claims:

Please amend the claims in accordance with the following listing:

Claims

1. (Currently amended) A method for measuring fluid density comprising the steps of:

Providing a sensor comprising a liquid phase acoustic wave device (LPAWD) having an entrapment layer coupled thereto, the entrapment layer having a textured surface in contact with said fluid, and having a known volume available for entrapping said fluid; the LPAWD comprising an input and an output transducers electromechanically coupled respectively to a first and second resonators, said first and second resonators being sufficiently coupled therebetween to provide said LPAWD with an electrical transfer function characterized by at least a first resonant frequency F_S and a second resonant frequency F_A at or about 180 phase shift relative to said F_s;

feeding an input electrical signal to said input ~~resonator~~transducer;

using said sensor measuring the density of the fluid.~~;~~

~~wherein said sensor provides sufficient information for measuring the density of said fluid.~~

2. (Original) A method for measuring fluid density according to claim 1 wherein said step of measuring further comprises the steps of:

measuring said second resonant frequency; and,

using said measured resonant frequency, and characteristic response of said LPAWD, calculating the density of the fluid.

3. (Original) A method for measuring fluid density according to claim 1, wherein said textured surface covers an approximately equal area of each of said resonators.

4. (Original)A method for measuring fluid density according to claim 1 wherein said step of measuring further comprises the step of using a calibration function to account for an approximated viscosity of said fluid.

5. (Original)A method for measuring fluid density according to claim 1 further comprising the steps of:

providing an amplifier coupled between said input and output transducers, said amplifier having a gain sufficiently high to cause signals therethrough to oscillate at or about said second resonant frequency F_A; and,

providing a frequency sensing circuit to sense changes in the frequency of oscillations.

6. (Currently amended) A method of measuring density and viscosity of a fluid the method comprising the steps of:

providing a sensor comprising a liquid phase acoustic wave device (LPAWD) having an entrapment layer coupled thereto or embedded therein, the entrapment layer having at least one textured surface for contact with said fluid, and having a known volume available for entrapping said fluid; the LPAWD comprising an input and an output transducers electromechanically coupled respectively to a first and second resonators, said first and second resonators being sufficiently coupled therebetween to provide said LPAWD with an electrical transfer function characterized by at least a first resonant frequency F_S, and a second resonant frequency F_A at or about 180 phase shift relative to said F_s;

feeding an input electrical signal to said input transducer;

using said sensor measuring the density of the fluid; and,

measuring the viscosity of the fluid;.

~~wherein said sensor provides sufficient information for measuring the viscosity of said fluid.~~

7. (Original) A method of measuring density and viscosity according to claim 6, wherein said input electrical signal is controlled to produce a predetermined shear rate under which said viscosity is being measured.

8. (Original)A method of measuring density and viscosity according to claim 7, wherein said shear rate is controlled by controlling said input electrical signal at an energy level, P_{IN}, to produce a desired displacement of said entrapment layer.

9. (Original)A method of measuring density and viscosity according to claim 8, wherein said energy level, P_{IN}, is calculated so as to obtain the requisite amplitude, U, to provide the desired shear rate, $\dot{\gamma}$, using the formulae: $U = \delta\dot{\gamma}/\omega$, where $\omega=2\pi F_A$ is the radian frequency, $\delta = \sqrt{2\eta/\omega\rho}$ is the penetration depth of the wave into a fluid having viscosity, η, and density, ρ, and the acoustic wave amplitude $U = C\sqrt{P_{avg}}$ is determined by a device constant, C, and an energy level, P_{avg}, being a geometric mean of power levels measured at said input P_{IN} and output P_{out} transducers.

10. (Original)A method of measuring density and viscosity according to claim 6 further comprising the step of measuring the power difference between the input and output transducers, to obtain a product of the viscosity and density of said fluid.

11. (Original)A method of measuring density and viscosity according to claim 6, wherein said step of measuring the density comprises measuring said second resonant frequency, F_A.

12. (Original)A method of measuring density and viscosity according to claim 6, wherein said textured surface covers an approximately equal area of each of said resonators.

13. (Original)A method of measuring density and viscosity according to claim 6, wherein said step of measuring the viscosity comprises measuring a product of viscosity and density, and further comprises the step of utilizing the measured density and said product.

14. (Original)A method of measuring density and viscosity according to claim 6, further comprising the step of using the measured viscosity to compensate for viscosity effects in said step of measuring density.

15. (Original)A method of measuring density and viscosity according to claim 6, wherein said step of measuring the density comprises measuring the said second resonant frequency, and wherein said step of measuring the viscosity comprises measuring power insertion loss between said input resonator and output resonator

16. (Original)A method of measuring density and viscosity according to claim 6, wherein said step of measuring the viscosity comprises measuring the shift of one or both of said resonant frequencies.

17. (Original)A method of measuring density and viscosity according to claim 6, further comprising the step of controlling the energy level of said input electrical signal so as to control the shear rate in which said viscosity is measured;

Wherein said step of measuring density comprises measuring the frequency shift of said second resonant frequencies; and,

Wherein said step of measuring the viscosity comprises measuring the power insertion loss between said first and second resonator.

18-65. (Cancelled)